

Development of Cool Colored Roofing Materials

Collaboration between BASF, Steelscape, Custom-Bilt Metals, LBNL and ORNL

Sponsored by the
California Energy Commission
(Project Manager: Chris Scruton)

Cool Metal Roofing – A Timeline

- ❖ *Early 2001* – BASF acquires cool pigment samples and begins research on incorporating them into PVDF formulas
- ❖ *Summer 2001* – BASF introduces “cool roof” to Steelscape and Custom Bilt. BASF creates new product line called ULTRA-Cool. Communication and sample exchange with LBL and ORNL begins. BASF becomes first coil coating producer to join ENERGY STAR roofing program.
- ❖ *Fall 2001* – BASF commercially launches ULTRA-Cool at Metalcon.
- ❖ *Early 2002* – Custom Bilt begins changing all traditional formulations to “cool”.
- ❖ *Spring 2002* – First ULTRA-Cool project is built at the Bandon Dunes Golf Resort. Cool Colored Roofing Materials project is launched; BASF and Custom Bilt join as partners.
- ❖ *Summer 2002* – Other end-users begin transitioning to ULTRA-Cool.
- ❖ *Fall 2002* – Other coil coating manufacturers begin introducing cool product lines. Cool Metal Roofing Coalition is formed to coordinate cool roof activities and educate public.
- ❖ *2003* – Work continues with LBL/ORNL as well as conversion of end-users to cool roof systems.
- ❖ *2004* – Steelscape joins project as a partner and launches their own cool roof paint system; Spectrascape MBM. To date Steelscape has approximately 150 cool colors in production.

Activities in Support of Project

BASF

- Shared non-proprietary research results on cool formulations.
- Prepared films for optical measurements and provided wet samples of ULTRA-Cool. Developed over 100 samples.
- Supplied coating mixing and application equipment.
- Provided accelerated weathering test results.
- Evaluation of the coating formulation software

Custom Bilt

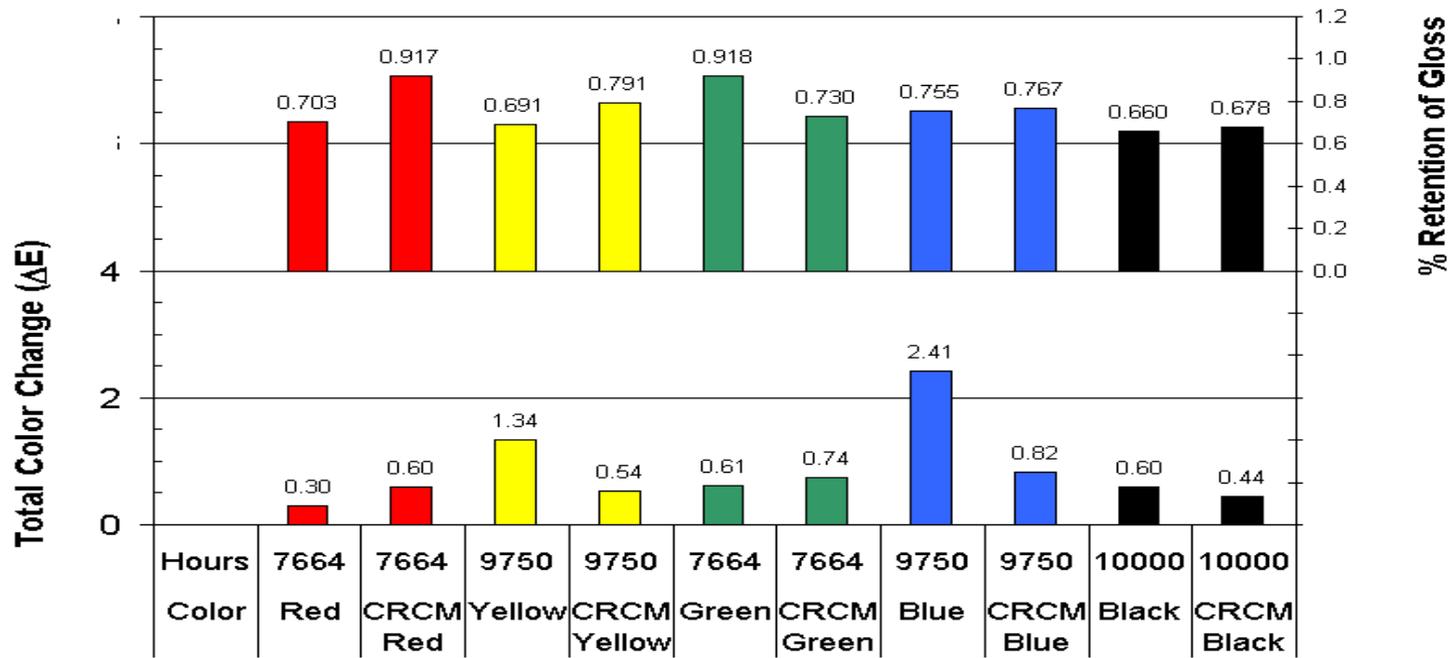
- Provided manufacturing process information.
- Shared market data and sales strategies.
- Supplied roofs for test homes in Sacramento as well as roof sections for testing at ORNL.

Steelscape

- Provided metal samples as needed, both bare and painted.
- Supplied detailed information on the coil coating process.

Product Testing

Fade Resistance & Gloss Retention of Painted Metals



Product Testing

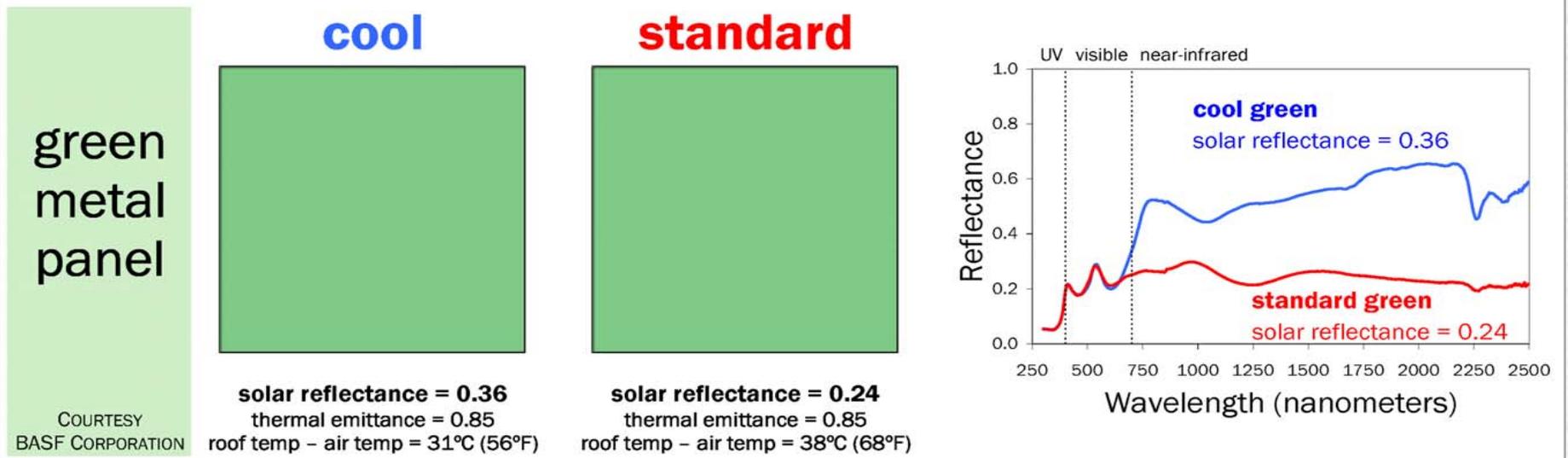
- Accelerated and outdoor performance monitoring of cool formulations continues.

- To date the cool formulation have met or exceeded the color and gloss retention of their “non-cool” counterparts.



Examples of Cool Metal Samples

- Cool green 12 °F cooler than standard green



Case Study: Baggett vs. Poole Elementary Schools

Two schools, same design, both in GA
Baggett – Standard Evergreen 12% SR
Poole – Cool Evergreen 29% SR



Actual Greystone Power
electric bill monitored for one
year.

Elementary School Study Results

Baggett Elementary (NON)
90,000 S.F. Evergreen

Poole Elementary
90,000 S.F. Evergreen

Greystone Power (Electric) for 2004

Provided by Paulding County Superintendent of Construction

Actual Invoices as provided

May	5,150.27	4,505.25
June	5,887.38	4,206.21
July	5,607.64	4,779.60
Aug	5,394.87	4,339.41
Sep	4,988.06	5,135.07

TOTAL \$28,043.00

\$22,965.00

1st Year Savings

\$8,803

Projected 20 Year Savings

\$101,650



C-Style Homes Finished with Painted Metal Shingles and Stucco

Custom-Bilt Metals

South facing roof



House-4 4991 Mariah Place

BASF Ultra Cool 31% reflective



House-2 4983 Mariah Place

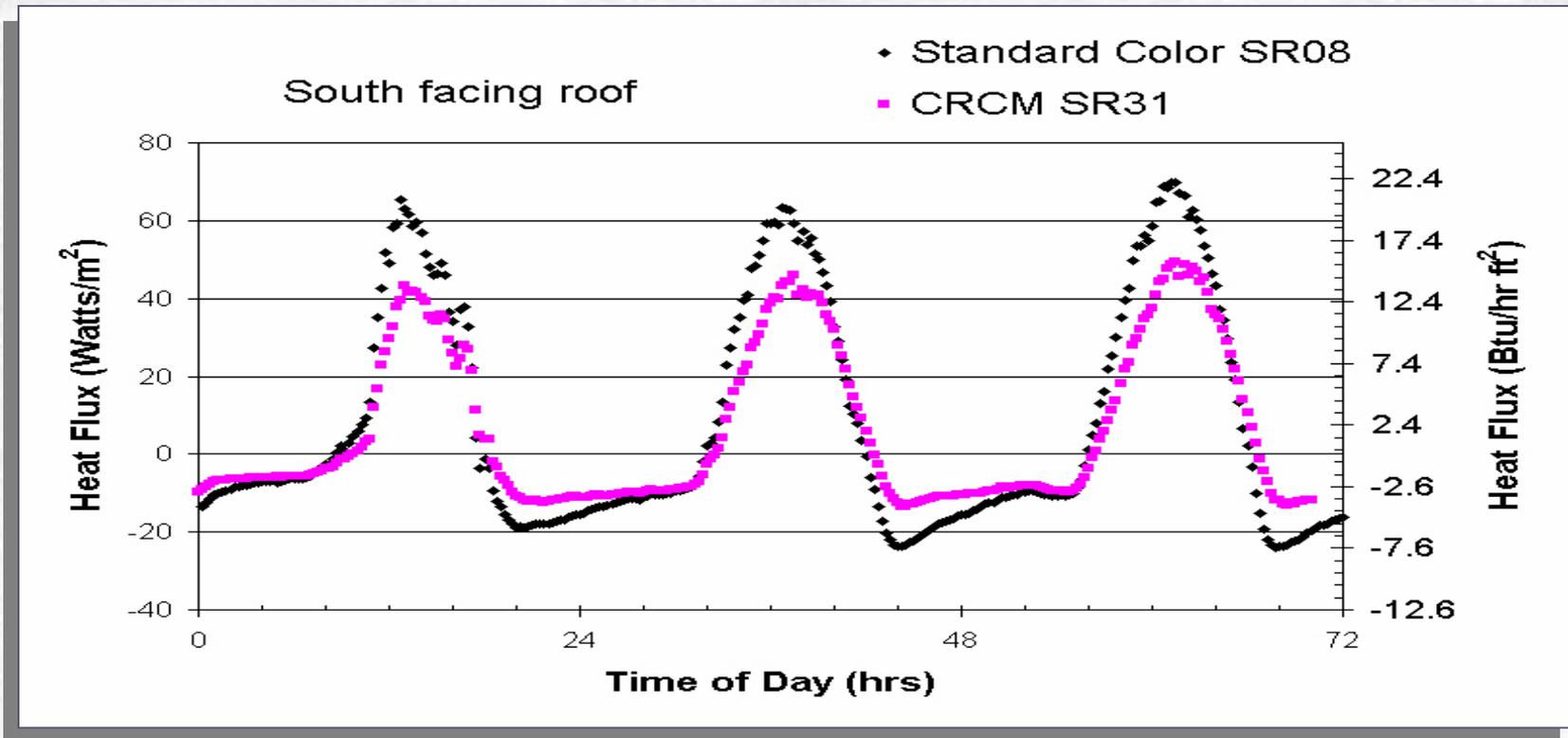
Continued real world monitoring of energy use is critical to gaining wider acceptance of cool roofs!

steelscape **BASF**

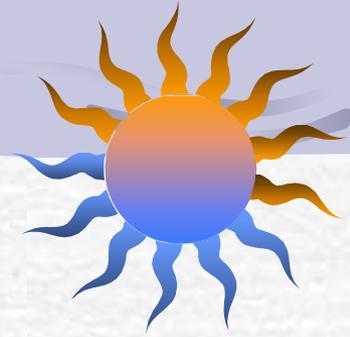


Cool Coating Reduces Heat Flux Through South Facing Roof Deck

Painted Metal Roofs



Moving Forward



Although cool roofs are beginning to gain market share and the public is starting to understand the concept, there is still a lot of work to be done . . .

- ☞ Software to estimate the cooling energy savings and peak demand reduction achieved by installing cool roofs on specific buildings.
- ☞ Monitor the solar reflectance and color change of the materials installed at the California weathering sites.
- ☞ Monitor the solar reflectance, color change, and thermal performance of materials at ORNL test facilities and the Sacramento test homes.
- ☞ Continue expanding cool coating database.
- ☞ Develop predictive software for design of cool coatings.
- ☞ Large-scale demonstration.
- ☞ Education of architects, specification writers and consumers.

